What is claimed is:

1. A method for detecting a likely event of interest, comprising:

providing a prediction model M for a detection system, wherein when each of a plurality of data samples are input to M, said model M outputs a prediction related to a subsequent one of said data samples following said prediction;

first predicting, by M, two consecutive predictions P_1 and P_2 of said predictions, while said detection system does detect a likely event of interest, E_1, such that E_1 is detected using an output by M;

wherein for said two consecutive predictions P_1 and P_2 (a1) through (a3) following hold:

(a1) P_1 is determined by M as a first function of a first multiplicity of said data samples that are provided to M prior to said P_1, wherein for each data sample, DS_1, from said first multiplicity of data samples, said detection system does not detect any likely event of interest, E_1, such that E_1 is detected using an output by M when DS_1 is input to M;

(a2) P_2 is determined by M as a second function of a second multiplicity of said data samples that are provided to M prior to said P_2, wherein for each data sample, DS_2, from said second multiplicity of data samples, said detection system does not detect any likely event of interest, E_2, such that E_2 is detected using an output by M when DS_2 is input to M; and

(a3) said first multiplicity of said data samples and said second multiplicity of said data samples do not differ by any one of said data samples DS received by M between a determination of P_1 and a determination of P_2;

first determining whether a later one of P_1 and P_2 results in detecting an occurrence of a likely event of interest;

second predicting, by M, two consecutive predictions P_3 and P_4 of said predictions while said detection system does not detect a likely event of interest, E_2, such that E_2 is detected using an output by M;

wherein for said two consecutive predictions P_3 and P_4 (b1) through (b3) following hold:

(b1) P_3 is determined by M as a third function of a third multiplicity of said data samples that are provided to M prior to said P_3, wherein for each data sample, DS_3, from said third multiplicity of data samples, said

detection system does not detect any likely event of interest, E_3, such that E_3 is detected using an output by M when DS_3 is input to M;

(b2) P_4 is determined by M as a fourth function of a fourth multiplicity of said data samples that are provided to M prior to said P_4,, wherein for each data sample, DS_4, from said fourth multiplicity of data samples, said detection system does not detect any likely event of interest, E_4, such that E_4 is detected using an output by M when DS_4 is input to M; and

(b3) said third multiplicity of said data samples is different from said fourth multiplicity of said data samples by one of said data samples DS_0 received by M between a determination of P_3 and a determination of P_4;

second determining whether a later one of P_3 and P_4 results in detecting an occurrence of a likely event of interest;

outputting, in response to a result from at least one of said steps of first and second determining, at least one of:

(c1) first data indicative of no occurrence of a likely event of interest being detected, and

(c2) second data indicative of an occurrence of a likely event of interest being detected.

2. The method of Claim 1, wherein said providing step includes training said prediction model M.

3. The method of Claim 1, wherein said prediction model M includes an artificial neural network.

4. The method of Claim 1, further including a step of receiving said plurality of data samples from at least one sensor for sensing environmental changes.

5. The method of Claim 1, wherein said first predicting step includes supplying for each of said predictions P_3 and P_4, one of said data samples as an input to an artificial neural network.

6. The method of Claim 5, wherein said artificial neural network includes a plurality of radial basis functions.

7. The method of Claim 1, wherein said first determining step includes determining a difference between: (i) said later one of P_3 and P_4, and (ii) said subsequent data sample related to said later one of P_1 and P_2.

8. The method of Claim 1, wherein said first determining step includes comparing (a) and (b) following:

(a) a measurement of a discrepancy between (i) and (ii) following: (i) at least one of said P_1 and P_2, and (ii) said subsequent data sample related to said at least one of P_1 and P_2 with

(b) a threshold obtained using a variance that is a function of other measurements, wherein each of said other measurements measures a discrepancy between one of said predictions prior to said at least one of P_1 and P_2, and said subsequent data sample related to said one prediction.

9. The method of Claim 1, further including:

determining a first relative prediction error between at least one of P_3 and P_4 and said subsequent data sample related to said at least one of P_3 and P_4; and

determining said variance from a standard deviation of a moving average of a plurality of prior relative prediction errors, wherein each of said prior relative prediction errors is derived from a particular one of said predictions prior to said at least one of P_3 and P_4, and from said subsequent data sample related to said particular prediction.

10. The method of Claim 1, wherein said first determining step includes determining whether, there is a series of said predictions, prior to and including P_3 and P_4, of a predetermined length, wherein there are almost consecutive predictions from said series, and each prediction of said almost consecutive predictions is used to obtain a corresponding value that is identified as outside a range that is expected to be indicative of no likely event of interest being detected.

11. The method of Claim 10, wherein said determining step includes comparing each of said corresponding values with a corresponding threshold indicative of a boundary between said range that is expected to be indicative of no likely event of interest being

detected, and a different range that is expected to be indicative of a likely event of interest.

12. The method of Claim 11, wherein said corresponding threshold is a function of a standard deviation of a plurality of measurements, wherein each of said measurements is obtained using at least one difference D between: (i) one of said predictions P_D provided by M prior to at least one of P_3 and P_4, and (ii) said related subsequent data sample for P_D

13. The method of Claim 12, wherein each of said measurements is essentially obtained from a predetermined plurality of said differences D, wherein said predictions P_D are not used by said detection system in detecting any likely event of interest.

14. The method of Claim 1, wherein said second predicting step includes determining each of P_1 and P_2 without either of said P_1 and P_2 being dependent upon one of said data samples that the other of said P_1 and P_2 is not dependent upon.

15. The method of Claim 1, wherein said second predicting step includes outputting, for at least one of said predictions P_1 and P_2, one of:

(a) one of said predictions immediately prior to a detection of said likely event of interest E_2;

(b) one of said data samples immediately prior to a detection of said likely event of interest E_2;

(c) an average of values obtained from some plurality of said predictions immediately prior to a detection of said likely event of interest E_2, wherein each prediction P of said some plurality of predictions is obtained when one or more of: (i) said detection system is-not detecting any likely event of interest, E, wherein E is detected using an output by M, and (ii) P does not result in said detection system detecting any likely event of interest; and

(d) an average of some plurality of said actual data samples immediately prior to a detection of E_2.

16. The method of Claim 1, wherein said second determining step includes comparing:

(c) a measurement of a discrepancy between: (i) said later one of P_1 and P_2, and (ii) said subsequent data sample related to said later one of P_1 and P_2 with

(d) a threshold obtained using a variance that is a function of other measurements, wherein each of said other measurements measures a discrepancy between one of said predictions prior to said later one of P_1 and P_2, and said subsequent data sample related to said one prediction.

17. The method of Claim 12, wherein said second determining includes determining said variance by computing a standard deviation of said other measurements.

18. The method of Claim 1, wherein said outputting step includes providing at least one said first and second data to one or more post processing subsystems for at least one: for further verifying that a detected likely event of interest is an event of interest, wherein said one post processing module , alerting a responsible party, and performing a corrective action.

19. The method of Claim 18, wherein said one or more post processing subsystems identify events of interest in said data samples wherein said data samples are obtained from images, sounds, and a chemical analysis.

20. The method of Claim 1, further including performing said steps of providing, first predicting first determining, second predicting, second determining, and outputting for each of a plurality of prediction models M, wherein each of said prediction models is trained to detect a likely event of interest substantially independently of every other of said prediction models.

21. A detection system for detecting a likely event of interest, comprising:

a prediction model M, wherein when each data sample of a plurality of data samples, C, are input to M, said model M outputs a prediction related to a subsequent one of said data samples following said prediction;

wherein M predicts predictions P_1, P_2, P_3, and P_4 of said predictions, such that (a1) through (a5) following hold:

(a1) P_1 and P_2 are consecutive predictions obtained while said detection system does detect a likely event of interest, E_1, such that E_1 is detected using an output by M;

(a2) P_3 and P_4 are consecutive predictions , obtained while said detection system is-not detecting any likely event of interest, E_2, such that E_2 is detected using an output by M,;

(a3) for each prediction P of predictions P_1, P_2, P_3, and P_4, P is determined by M as a function of a corresponding multiplicity of said data samples C that are provided to M prior to a determination of P, such that for each data sample, DS, from said corresponding multiplicity of data samples, said detection system does not detect any likely event of interest, E, such that E is detected using an output by M when DS is input to M;

(a4) said corresponding multiplicity of said data samples for P_1 and said corresponding multiplicity of said data samples for P_2 do not differ by any one of said data samples DS used by M between a determination of P_1 and a determination of P_2;

(a5) said corresponding multiplicity of said data samples for P_3 is different from said corresponding multiplicity of said data samples for P_4 by one of said data samples DS_0 used by M between a determination of P_1 and a determination of P_2;

a prediction engine for receiving said predictions and determining whether a likely event of interest is detected, wherein said prediction engine includes one or more programmatic elements for comparing (c1) and (c2) following:

(b1) a measurement of a discrepancy between (i) and (ii) following: (i) P_1, and (ii) said subsequent data sample related to P_1; and

(b2) a threshold obtained using a variance that is a function of other measurements, wherein each of said other measurements measures a

discrepancy between one of said predictions prior to P_1, and said subsequent data sample related to said one prediction.

22. The apparatus of Claim 21, wherein said prediction model includes variables whose values adapt with said data samples.

23. The apparatus of Claim 21 further including a plurality of prediction models, wherein each prediction model M_0 of said plurality of prediction models has a different corresponding collection C_0 of data samples as input thereto, and wherein said model M_0 outputs a prediction related to a subsequent one of said data samples for C_0 following said prediction, wherein M_0 predicts predictions $P_{0,1}$, $P_{0,2}$, $P_{0,3}$, and $P_{0,4}$ of said predictions, such that (a1) through (a5) hold when P_1, P_2, P_3, and $P_4$are replaced with $P_{0,1}$, $P_{0,2}$, $P_{0,3}$, and $P_{0,4}$ respectively, and said data samples C is replaced said collection C_0.:

24. A method for detecting a likely event of interest, comprising:

providing one or more of computational models so that for each of said models M, when M receives a corresponding one or more data samples DS, said model M outputs a prediction P_M related to a subsequent data sample DS_P of said corresponding one or more data samples;

for each of said models M, and for a corresponding collection C_M of a plurality of said predictions P_M by M, perform the following steps (A) through (C):

(A) first determining a value V of a first threshold, V being dependent upon, for each P_M of C_M, a measurement of a variance between: (a1) the P_M of C_M, and (a2) the subsequent data sample DS_P related to P_M of (i);

(B) comparing, for a prediction P_0 output by M: (b1) a variance between P_0 and its related subsequent data sample DS_0 with (b2) said first threshold value V;

(C) second determining, using a result from said step of comparing, whether there is a change between: (c1) an instance of a likely event of interest occurring, and (c2) an instance of a likely event of interest not occurring;

wherein for at least one of said models, M_0, there is a prediction P_1 by M_0 that is dependent on one of said data samples, DS, and an immediately previous predication P_2 by M_0 is independent of DS; and wherein there are consecutive predictions P_3 and P_4 by M_0 that do not differ by any one of said data samples DS used by M_0 between a determination of P_1 and a determination of P_2.

25. The method of Claim 24, further including, for at least one of said models M_x, a step of obtaining said collection C_M for Mx mostly from a set of predictions by M_x, wherein each prediction P of said set is identified according to an indication that said prediction P is not indicative of an instance of a likely event of interest occurring.

26. The method of Claim 25, further including a step of determining said indication by comparing a variance between P and its related subsequent data sample with a value for said first threshold that was determined prior to determining the value V.

27. The method of Claim 26, wherein said step of determining includes generating P using different data from data used in generating an immediately previous prediction by M_0.

28. The method of Claim 27, wherein between the step of generating P and a step of generating said immediately previous prediction, M_x adaptively changes a value of at least one variable that in turn results in difference between P and said immediately previous prediction.

29. The method of Claim 24, wherein for at least one of said models M_x, said step of first determining includes obtaining a standard deviation of measurements that are dependent upon, for each P_M of C_M for M_x, a difference between: (i) and (ii) of step (A).

30. The method of Claim 29, wherein said step of obtaining includes determining said measurements using substantially only predictions by M_x that are not identified with a likely event of interest.

31. The method of Claim 24, wherein said first threshold one of: a threshold for determining when a likely event of interest is detected, a threshold for determining when a likely event of interest terminates.

32. The method of Claim 24, further including a step of generating, by at least one of said models, a prediction by activating an artificial neural network

33. The method of Claim 24, further including a step of generating, by at least one of said models, a prediction by activating one of: a Bayesian forecasting process, a regression process, and a Box-Jenkins forecasting process.

34. The method of Claim 24, further including a step of adapting a signal receiver to receive a desired signal in an environment of changing signal conditions causing interference with the desired signal, wherein at least one of said models generates predictions that are indicative of said desired signal.

35. A method for determining a likely event of interest, comprising:

supplying, to each of one or more adaptive models, a corresponding series of data samples,

for each of said adaptive models M, and for each data sample ds_A of said corresponding series S_M, perform the following steps (a) and (b):

(a) generating a prediction, by M, when ds_A is input to M, wherein said prediction includes a value v which is expected to correspond to a data sample ds_B of S_M wherein ds_B is subsequent to ds_A in S_M;

(b) inputting information to M obtained from one or more errors in said predictions by M in order to reduce at least one of: (i) subsequent instances of said prediction errors by M, and (ii) a variance in the subsequent instances of said prediction errors,

for at least one of said adaptive models, M_0, said step of inputting is performed substantially only when corresponding series is not indicative of a likely event of interest, and for said M_0, performing the following steps:

(c) obtaining a measurement V of variance of a plurality of prediction errors between said values v and their corresponding values v_B for M_0;

(d) determining a further instance of one of said prediction errors for M_0;

(e) determining a relationship between said variance V and said further instance for determining whether a likely event of interest has likely occurred; and

(f) when the likely event of interest is detected, M_0 determines at least two consecutive predictions during said likely event of interest, wherein said predictions are only dependent on the predictions errors of M_0 obtained prior to an earlier of said consecutive prediction errors.